SOCIAL BEHAVIOR AND PERSONALITY, 1999, 27(1),1-10
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PERSONALITY NOT INTELLIGENCE OR EDUCATIONAL ACHIEVEMENT DIFFERENTIATE UNIVERSITY STUDENTS WHO ACCESS SPECIAL NEEDS FOR "LEARNING DISABILITIES"

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University students who had been referred over a three year period from a special needs office because of putative learning disabilities were compared to randomly selected cohorts. There was no evidence of learning disabilities. Standardized scores for intelligence memory and educational achievement were all within the average range for both groups. Although there was no evidence of significant psychopathology in either group, the special needs group was significantly more immature, dependent, attention seeking and emotionally sensitive than the reference group. Only four of these variables were required to classify accurately 94% of all of the students (canonical correlation = 0.82). The results indicated that standardized norm-referenced assessment is essential to determine the actual etiologies for university students who request "special needs" because of putative learning disabilities. Implications of strategies for counselling these students are discussed.

Professionals responsible for pedagogical opportunity have attempted to accommodate the specific needs of individuals who wish to attend university or college. Students can access special needs offices whose personnel attempt to facilitate their success within academic contexts. Claims of a learning disability, which are frequently employed to rationalize additional time to complete examinations, appear to have increased within the last decade. Strategies from which counselling psychologists design interventions for these students presume construct validity. The results of this experiment suggest that the etiology of many of the honest claims of learning disability by university students may not involve

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this behavioral domain.

The definition of learning disability, which has been applied traditionally to children and to adolescents whose educational achievement was two or more years below their intellectual level, becomes nebulous within post-secondary education. Discrepancies of more than one standard deviation between the student's intelligence and educational achievement (as defined by the Wide Range Achievement Test) have been considered indicative of a learning disability (Bigler, 1992). However there are other possible etiologies. Such discrepancies could reflect failures to acquire information because of the selection of inappropriate high school courses rather than the existence of intrinsic learning anomalies.

The variables that determine students' requests for exceptions or exemptions because of special needs (such as additional hours for examinations or different formats of evaluation) are not clear. Beliefs that a student has a learning disability or requires special needs are not necessarily a proof of their existence. This experiment was designed to determine if: 1) empirical differences actually existed within a population of students who were referred because of "learning problems" and 2) specific factors, such as intelligence, memory capacity, educational achievement, or personality variables, could differentiate the students who access these services from those who do not.

METHOD

Subjects

A total of 35 university students (19 men; 12 women), 18 to 27 years of age ($M = 20$, $SD = 1.6$) served as subjects. The clinical group was composed of 16 university students (10 men and 6 women) who had been referred consecutively over a three year period for psychometric assessment because they or the referring agency suspected a learning disability or believed they required special needs. The reference (control) group consisted of 19 (13 men and 6 women) university students who were randomly selected from a first year psychology class ($n = 70$) to receive the same assessment. Chi-squared analysis [$(df = 1) = 0.15$, $p > .05$] indicated no significant disconcordance between the proportion of men and women within the two groups.

Procedure

Each subject was administered the Wechsler Adult Intelligence Scale-Revised (WAIS-R), the Wechsler Memory Scale (WMS), the Wide Range Achievement Test (WRATR-2), the Minnesota Multiphasic Personality Inventory-168 (Vincent, et al., 1984) and Cattell's 16 PF (see Karson & O'Dell, 1976). The students were tested by qualified psychometrists or by senior psychology students who had been trained by technical staff. The scoring and calculations for all tests were verified by an additional qualified psychometrist.

Because thorough neuropsychological assessments were also completed for 11 of the 16 students who had been referred because of a putative learning disability, these results were compared to the other psychometric data. In addition to the Halstead-Reitan Battery (Reitan & Wolfson, 1985) we routinely employed diagnostic measures such as a Dichotic Word Listing Test, the Rey Copy and (+30 min) Memory Test, Design Fluency and the Conditioned Spatial Association Task; a complete description of these tasks and their procedures has been published elsewhere (Makarec and Persinger, 1993, 1995; Persinger, 1993; Persinger and Richards, 1995). Two general neuropsychological impairment scores were employed: 1) the age-adjusted (Heaton, Grant and Matthews, 1991) score for the Halstead-Reitan Impairment Index and 2) the mean of 31 different z scores for key inferences of neurocognitive function (Persinger, 1995a). The normative data had been collected over the years as a component of our general experimental/clinical and counselling research (Persinger & Makarec, 1993; Persinger & Richards, 1995). All analyses involved SPSS software on a VAX 4000 computer.

RESULTS

TABLE I

MEANS AND STANDARD DEVIATIONS FOR STANDARDIZED INTELLECTUAL (VIQ, PIQ, FSIQ), GLOBAL MEMORY AND EDUCATIONAL ACHIEVEMENT (READING, SPELLING AND ARITHMETIC) SCORES FOR THE STUDENTS REFERRED BECAUSE OF SPECIAL NEEDS ("LEARNING DISABILITY") AND FOR A RANDOMLY SELECTED, AGE MATCHED REFERENCE (CONTROL) GROUP.

Scale	Reference Group		Special Needs Referrals	
	M	SD	M	SD
VIQ	101.9	8.2	99.6	10.1
PIQ	104.8	13.0	98.2	14.9
FSIQ	103.5	8.8	98.5	10.7
MQ	114.1	12.5	103.8	10.2*
Reading	108.2	10.9	105.3	11.9
Spelling	101.9	7.4	101.8	13.5
Arithmetic	97.8	13.7	90.5	15.8

*$p < .01$

The means and standard deviations for the standardized scores for verbal intelligence (VIQ), performance intelligence (PIQ), full scale intelligence (FSIQ), global memory (MQ) and the achievement tests (reading, spelling and arithmetic) are shown in Table 1 for the special needs and (random) reference groups. The standardized mean and standard deviation for each of these measures were 100 and 15, respectively. All of the means for these inferences of intelligence, general memory capacity and educational achievement were within the average range (+/- 1 SD).

Two way analyses of variance as a function of group (clinical vs reference) and gender demonstrated no statistically significant differences [all Fs <1.50, $p > .05$]

between the groups or sexes (or significant interactions between sex and group) for any of the inferences of intelligence or educational achievement. Although the global memory score for the special needs group was within the normal range, it was significantly [$F(1,31) = 6.86$, $p < .01$] lower than the score for the reference group. The group differences accommodated 17% of the variance in the memory scores.

The primary source of this anomaly emerged from the reference group. Post hoc two way analyses of variance with one level repeated (scores for memory, full scale intelligence and educational achievement) and one not repeated (sex) demonstrated no significant differences between gender [$F(1,13) = 0.04$, $p > .01$] or test scores [$F(2,26) = 3.35$, $p > .01$] for the special needs group; the interaction between tests and gender was also not statistically significant [$F < 1.00$]. Although the reference group also did not display statistically significant sex differences [$F(1,17) = 0.40$, $p > .05$], significant differences between tests [$F(2,34) = 9.98$, $p < .001$] were evident and explained 37% of the variability. Post hoc analyses (correlated t-tests) indicated that these students exhibited significantly higher scores for memory relative to their scores for general intelligence ($t = 4.99$; $p < .001$) or educational achievement ($t = 4.10$, $p < .001$); the latter two did not differ significantly from each other.

To discern the existence of relative weaknesses within these domains between the two groups, the differences between (1) the standardised scores for the verbal and performance intelligence scores, (2) general memory and full scale intelligence scores, (3) full scale intelligence score and the mean (of spelling, reading and arithmetic) achievement score, and (4) the memory score and the average achievement score, were calculated for each person. There were no statistically significant [(all Fs (1,33) <2.00, $p > .01$] differences between the groups. Whereas only one student within the special needs group exhibited a standardised achievement score that was more than one standard deviation below his or her intelligence score, two of the reference (control) students displayed this discrepancy (all scores less than $z = -1.5$).

To estimate the generalizability of these samples of students, correlations between their verbal intelligence, performance intelligence, memory capacity and the three domains of achievement were completed. The general associations between verbal intelligence and reading skills and performance intelligence and arithmetic skills were verified. Whereas verbal intelligence was significantly correlated with reading ($r = 0.67$, $p < .01$) only, performance intelligence was significantly correlated with arithmetic proficiency ($r = 0.55$, $p < .01$).

Factor analyses (PA 1 method) confirmed the associations. After varimax rotation, factor 1 (eigen value = 3.06; 51% of the variance explained) was significantly ($r > 0.50$) loaded by verbal intelligence ($r = 0.68$), memory capacity ($r = 0.58$), reading (decoding) accuracy ($r = 0.87$) and spelling accuracy ($r = 0.86$). On

the other hand, factor 2 (eigen value = 1.14, 19% of the variance) was loaded significantly ($r > 0.50$) by the performance intelligence score ($r = 0.92$), the memory score ($r = 0.51$) and the score for the knowledge and execution of arithmetic skills ($r = 0.74$)

TABLE 2
MEANS AND STANDARD DEVIATIONS FOR MINNESOTA MULTIPHASIC PERSONALITY INVENTORY (MMPI-168) SCALES AND FOR THE REFERENCE GROUP AND THE UNIVERSITY STUDENTS WHO WERE REFERRED BECAUSE OF LEARNING DIFFICULTIES

Scale	Reference Group		Special Needs Referrals	
	M	SD	M	SD
Lie	45	6	50	8
Frequency	57	7	65	10*
K (Defense)	46	6	47	9
Hypochondriasis	50	10	58	14
Depression	56	10	67	12*
Hysteria	51	6	63	8**
Psychopathic Dev	55	10	64	12*
MF	53	9	54	13
Paranoia	56	9	59	10
Psychasthenia	51	10	62	9*
Eccentric Think	55	11	53	9
Hypomania	69	12	72	11
Social Introv	54	8	55	13

*$p < .01$
**$p < .001$

The means and the standard deviations for the personality (MMPI) profile for the group of university students who had been referred because of special requirements compared to the reference (control) group are shown in Table 2. The standardized mean and standard deviations for these scales are 50 and 10, respectively. Compared to the reference group (all df = 1,33), the students who requested special needs displayed significant ($p < .01$) elevations on scales that infer Depression ($F = 8.23$, eta = 0.44), Hysteria ($F = 21.49$; eta = 0.65), Psychopathic Deviancy ($F = 5.78$; eta = 0.40) and Anxiety ($F = 10.39$, eta = 0.48].

To discern the prevalence of potential individual psychopathology, as defined by T-scores exceeding 70 for any of the clinical scales, the numbers of scales per person that exceeded this criterion were calculated. Scores for the validity scales indicated that all 35 profiles were valid. There were no statistically significant differences [$F(1,33) = 4.40$, $p > .01$] between the numbers of extreme scores (sufficient to require psychiatric intervention) between the special needs and reference groups. With the exception of the hypomania scale (50% of both groups), the percentages of students who exhibited scores exceeding a T value of 70 ranged between 0 and 25% (Depression) for the 10 clinical scales.

The means and standard deviations for each of the 16 factors of the Cattell personality inventory are shown in Table 3. Measures for these factors are ex-

pressed as sten scores (range 1 through 10). The students who had been referred for learning problems displayed significantly [$F(1,33) = 8.73$, $p < .01$; eta = 0.46] higher scores on a single factor that is typical of people who are more emotionally sensitive (over-protected) and who expect affection and attention. There were no statistically significant differences between the groups for any of the other factors. Because the 16PF scores are expressed as sten values whose integers do not represent equal intervals of standardized deviations from the mean, non-parametric (Kruskal-Wallis) comparisons were also completed. The significant elevation of the referred students for the emotional sensitivity factor was verified.

TABLE 3
MEANS AND STANDARD DEVIATIONS FOR STEN SCORES FOR EACH OF THE 16 PERSONALITY FACTORS OF THE CATTELL PERSONALITY INVENTORY FOR STUDENTS WITHIN THE REFERENCE GROUP AND THE REFERRALS FOR SPECIAL NEEDS.

Factor	Reference Group M	Reference Group SD	Learning Problem M	Learning Problem SD
Warmth	5.0	1.7	5.2	1.6
Intelligence	4.8	1.5	4.5	2.1
Emotion Stable	5.8	2.1	5.5	2.3
Dominance	6.1	2.3	6.1	2.3
Impulsivity	6.1	2.8	4.6	2.3
Group Conformity	4.8	2.2	5.4	1.5
Boldness	5.7	2.3	5.5	2.6
Emotion Sensitive	4.6	1.4	6.6	2.3*
Suspiciousness	5.5	2.0	5.6	2.0
Imagination	4.4	2.1	5.3	2.2
Shrewdness	5.2	1.5	6.6	2.5
Guilt Proneness	4.7	2.2	6.0	2.2
Rebelliousness	5.9	1.7	6.0	2.2
Self-Sufficiency	6.4	2.0	6.8	1.9
Control	5.8	2.1	5.8	2.1
Anxiety	5.6	2.7	5.5	2.3

* $p < .01$

TABLE 4
PARAMETERS FOR VARIABLES, INCLUDING THE UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS (UCDFC), THAT MAXIMALLY DISCRIMINATED STUDENTS WITHIN THE REFERENCE GROUP (N=19) AND SPECIAL NEEDS GROUP (N=16)

Variable	Wilks Lambda	change in V	UCDFC	beta
Hysteria	0.59	22.87	-0.122	0.52
Memory Quotient	0.45	17.23	0.066	-0.39
Eccentric Think	0.39	11.67	0.071	-0.35
Psychasthenia	0.32	17.18	-0.058	0.31
Constant			-0.86	

canonical correlation: 0.82 Correct Classification: 94%

Because the major thrust of this experiment was to determine the feasibility of accurately differentiating students who believed they had special needs from a random group of university students, discriminant analysis was completed be-

tween the groups for all of the measures of intelligence, memory, educational achievement and personality (MMPI variables only). Discriminant analysis (Rao's method) generated a powerful function (canonical correlation = 0.82, $p < .001$) that was composed of only four variables: "hysteroid characteristics", general memory capacity, eccentric thinking and apprehension. It was sufficient to classify accurately 94% of the two groups. The characteristics of the function as well as the regression coefficients are shown in Table 4.

To discern the internal reliability of the function, these four variables were employed to discriminate only half the numbers of subjects in the reference and special needs group; the accuracy of classification was 94%. This specific function was then employed to classify the other half of the subjects from each of the two groups; the accuracy of classification was 94%. The function stated that the linear combinations of: increases in scores for hysteria, decreases in scores for general memory, more concrete thinking (lower scores for eccentric thinking) and increases in psychasthenia (ruminating apprehensive) scores optimally discriminated students who believed they had special needs from the reference group.

The means and standard deviations (in parentheses) for the z scores for the Halstead-Reitan (HR) Impairment Index and our global neuropsychological impairment index (the mean of z scores for 31 different measures) for the 11 students who had been referred because of learning disabilities and who also had been administered the neuropsychological battery were: 0.3 (1.5) and 0.2 (0.6), respectively. None of the correlated t-tests between the means of the z scores for the verbal intelligence, performance intelligence, and average educational achievement scores and the z scores for the HR Index and our global impairment score were statistically significant ($p > .05$). Stated alternatively, there was no general statistically significant difference between the referrals' intellectual, achievement or neuropsychological capacities.

In order to employ the criteria that we apply to clinical cases (Persinger, 1995b), the standardised z scores for the two components of intelligence and the average (of reading, spelling and arithmetic) achievement score were subtracted from the z scores for the HR Index and our global neuropsychological index for each student (a total of 6 scores). Only one referral student demonstrated a neuropsychological discrepancy that was one standard deviation or more below the standardised score for intelligence or for academic achievement.

DISCUSSION

The results of this study indicated that students who believed they experienced a learning problem and who believed they had special needs exhibited average scores for verbal (crystallised) intelligence, performance (fluid) intelligence, general memory capacity and average educational achievement. Because there were

no statistically significant discrepancies between their standardized educational achievement scores and either their memory scores or their intellectual level, they would not achieve the most general criteria of a learning "difficulty". Stated alternatively, these students' intelligence, memory capacity and educational achievement were within the average range.

Comparisons with a random selection of students (25% of the total number of students) who were enrolled in a first year arts course indicated that the students who requested special needs did not display significantly different levels of intelligence or educational achievement. However this group of special need students displayed significantly lower memory capacity (although still within the average range) than did the reference group. Post hoc-analyses indicated that the anomaly existed within the reference (control) group whose memory capacity was significantly higher than their intellectual level. Although this difference was equivalent to a correlation coefficient of only 0.42, its magnitude may be sufficient to influence the task-demands for remembering and writing notes during lectures. The possibility that normal students who continue within arts courses are selected and reinforced because of their enhanced short-term memory capacity requires further investigation.

Clearly the most discriminating source of variance between the students who were randomly selected and those who requested special needs involved personality. According to a standardized personality inventory, the students who were referred for problems exhibited elevations on scales that infer hysteria, depression and anxiety. Superficially at least these results are similar to those reported by Gregg, Hoy, King, Moreland and Jagota (1992).

However actuarial interpretation (Duckworth and Anderson, 1986; Lachar, 1985) indicates that, as a group, the students who were referred for putative learning disabilities would be more egocentric and dependent. During periods marked by schedule changes (moving from home; loss of social status, alteration in friends), people with this profile experience anxiety or depression. Their cognitive style encourages attempts to obtain attention by deviating from conventional rule systems.

This general profile was verified by a second personality inventory (Cattell's 16PF) whose items are derived from normal concepts of behavior and from different psychometric assumptions. The students who requested special needs exhibited a profile that characterises normal people who are more demanding, impatient, dependent, imaginative, attention seeking and indulgent to themselves and to others. These individuals routinely seek help and sympathy (Karson and O'Dell, 1976).

However application of actuarial criteria did not indicate that any of these students exhibited behavioral extremes that were sufficient for psychiatric intervention. The percentages of referrals (from a special needs office) whose stand-

ardized score on each scale of the MMPI exceeded 70 were less than 7% and were similar in magnitude to other studies (Ackerman, McGrew and Dykman, 1987). The fact that both the reference group and the referral group exhibited marked elevations on hypomania may reflect an artifact of the reduced numbers of items for this scale for the MMPI 168. However elevations for hypomania were also found by Ackerman, McGrew and Dykman (1987).

The fact that only four variables were sufficient to classify 94% of 35 students reliably and accurately suggests robust psychometric differences may exist between university students (with average intelligence) who believe they have special needs and those who do not. One interpretation of the discriminant function is that the students who requested special needs, such as longer periods to complete examinations or special types of examinations, do not objectively require these privileges because neither intelligence nor educational achievement differentiates them from other students.

Instead these students may be experiencing anxiety or depression because of their relative memory weakness (compared to the typical university student) which is exacerbated by the demands of the university environment. The anxiety and depression would be secondary to the inappropriate reliance upon the strategy of "memorization", which appears to be a primary mode of studying that is encouraged by most high school curricula. Individuals who show average memory capacity and who employ only this strategy to prepare for academic examinations, may no longer be capable of adapting to the consolidation rates required by university courses. Because personality can be defined as the behavioral pattern by which the person adapts to his or her environment, the students whose personalities are dominated by a propensity to seek help and to circumvent rule systems would be more likely to request special needs. However this interpretation does not require the explanation that these students are either aware of their cognitive styles or are purposefully manipulating the system.

Although we certainly do not reject the existence of potential learning disabilities within a restricted portion of the population, the results of this study suggest that the students' verbal reports, concurrent academic difficulties, or history of "diagnosis" of disability are not veridical indicators. If the criteria and arguments of Bigler (1992) are employed, these students exhibited neither discrepancies between intelligence and educational achievement nor significant differences between intelligence and neurocognitive proficiency (the inverse of neuro-psychological impairment).

The major potential limitation of these results could be due to some recondite characteristics that resulted in the specific referral. Because the standard deviations for the intellectual, memory, educational and personality scales were within the average range, the possibility that either the reference group or the special needs group was skewed or biased is minimal. The normality of the distribution of

scaled scores for both groups indicate that our procedures for measurement did not contribute significantly to the effects. The results of this study strongly suggest that: 1) standardized, norm-referenced testing of university students who utilize special needs services because of putative "learning disability" and 2) *competent actuarial interpretation* of these results, could augment the counsellor's or clinician's selection of strategies and tactics that would facilitate the student's appropriate adaptation to the variable schedules of academic challenge.

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